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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,301	04/22/2005	Jae Yeon Lee	122991-05050673	1124

22429 7590 09/14/2007
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EXAMINER	
REDDING, THOMAS M	
ART UNIT	**PAPER NUMBER**
2624	

MAIL DATE	DELIVERY MODE
09/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/532,301	LEE ET AL.	
	Examiner	Art Unit	
	Thomas M. Redding	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/22/05, 1/5/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The following quotations of 37 CFR § 1.75(a) is the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

2. Claim 1 and 5 are objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. Line 25 of claim 1 refers to "the feature vector". However, three (3) entirely distinct feature vectors are established in the "feature extraction unit". It is unclear which of the three feature vectors is being referred to be line 25. The same limitation is recited in claim 5.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 - 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moussa et al. (US 5, 680,470) in combination with Fan et al. (US 5,111,512).

Regarding claims 1 and 5, Moussa teaches, [a]n apparatus for online signature verification ("The invention provides a method of automated signature verification", Moussa,

column 1, line 44, and figure 1 showing the apparatus) analyzing a reference signature database (DB) of a specific user ("test features may be compared against features of a set of template signatures", Moussa, column 1, line 44), the apparatus comprising:

a signature data input unit for digitalizing a locus of a user signature and reading the digitized locus as a sequence of points sampled at regular time intervals ("data transmitted by the input device 107 to the processor 106 may be periodically retrieved by the processor 106, as is well known in the art, and stored in a data structure associated with the template input signature 103", Moussa, column 3, line 60 and the data collected is: "$P_n = [X_n, Y_n, T_n, S_n, PR_n]$ where X_i =X-coordinate of pixel, Y_i =Y-coordinate of pixel, T_i =time when pixel captured, S_i =pen-up/pen-down status of the writing implement 104 at that time, PR_i =pressure of the writing implement 104 at that time", Moussa, column 4, line 3);

a second pattern transform unit for performing a velocity transform on the signature sequence read by the signature data input unit and generating a second transformed pattern sequence ("One class of features may include time series data, e.g., pen-up/pen-down status, pen position, writing pressure, or writing speed or acceleration, each expressed as a function of time", Moussa, column 6, line 47);

a feature extraction unit for extracting three feature vectors from the signature sequence read by the signature data input unit, the first pattern sequence transformed by the first pattern transform unit *(the first pattern transform is taught by Fan below)* and the second pattern sequence transformed by the second pattern transform unit, respectively, to thereby generate the three feature vectors having different information ("In a preferred embodiment of the invention, seven specific features of the input signature 103 may be identified. These features may include

time series data, such as (1) movement of the writing implement 104 as a function of time, (2) speed of the writing implement 104 as a function of time, (3) pen-up/pen-down status of the writing implement 104 as a function of time, and (4) pixel dispersion as a function of time", Moussa, column 6, line 66);

a difference vector estimation unit for generating a difference vector between the feature vector of the specific user's reference signature read from the reference DB and the feature vector extracted by the feature extraction unit; and a determination unit for determining whether an input signature and the reference signature are signed by a single person, based on the difference vector generated from the difference vector estimation unit (Moussa, figure 10, reference 1001 calculates a difference vector, reference 1003 makes a determination of match).

Moussa does not teach a first pattern transform unit for performing a speed equalization on the signature sequence read by the signature data input unit and generating a first transformed pattern sequence;

Fan, working in the same field of endeavor of signature verification, does teach a first pattern transform unit for performing a speed equalization on the signature sequence read by the signature data input unit and generating a first transformed pattern sequence ("The transformation consists of locally changing the scale of the time axis of one signal relative to the other in order to minimize the distance between the two signals", Fan, column 2, line 39);

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the speed equalization method of Fan with the analysis system of Moussa "in order to minimize the distance between the two signals" (Fan, column 2, line 43), allowing a more precise comparison.

Regarding claim 2, the combination of Moussa and Fan teaches wherein the first pattern transform unit transforms the signature sequence read by the signature data input unit and generates the first transformed pattern sequence, the transform being performed by using a following equation:

$$s_i = p_i \qquad i=1, 2$$

$$s_i = s_{i-1} + (p_i - p_{i-1}) \qquad i=N-1, N$$

$$s_i = s_{i-1} + v\Delta t \cdot \Theta \qquad \text{otherwise}$$

wherein p_i, s_i, v, Δt, and Θ represent a point on an input signature pattern locus, an element of a transformed two-dimensional vector list, a velocity, a time interval between sample points, and a unit vector in the direction of Θ, i.e., in the locus at the point p_i, respectively ("At a step 605, a euclidean coordinate feature, comprising a euclidean coordinate map of the input signature 103, may be identified and represented as an array of integers", Moussa, column 7, line 22, the equation above merely regenerates the x, y points of the input coordinates. One of Moussa features uses the coordinates in a comparison of signature and template. Moussa's Euclidean coordinate method is equivalent to applicants transformed pattern sequence.)

Regarding claim 3, the combination of Moussa and Fan teaches wherein the second pattern transform unit transforms the signature sequence read by the signature data input unit and generates the second transformed pattern sequence, the transform being performed by using a following equation:

$v_i=v_3$	i=1, 2
$v_i=v_{N-2}$	i=N - 1, N
$v_i= (v_{xi}, v_{yi})$	otherwise

wherein the v_i is an element of the transformed two-dimensional vector list, and v_{xi} and v_{yi} are first horizontal and vertical derivatives at the point p_i on the input signature pattern locus ("At a step 602, a pen speed feature, comprising speed of the writing implement 104 as a function of time, may be identified and represented as a vector of integers", Moussa, column 7, line 12, Moussa uses a velocity vector as a feature in determining the degree of match of a candidate signature template).

Regarding claim 4, the combination of Moussa and Fan teach wherein the speed equalization is a technique for recomposing a signature pattern based on an inverse proportional relation between a signature speed and a length of the pattern ("The transformation consists of locally changing the scale of the time axis of one signal relative to the other in order to minimize the distance between the two signals", Fan, column 2, line 41, changing the scale of one axis will

affect the length of the pattern), and the velocity transform is a technique for transforming a spatial pattern into a velocity domain ("the speed function is not averaged over the sample set, but rather is derived only from the smoothed x(t) and y(t) data for the first reference signature", Fan, column 3, line 12).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TMR/

/Brian P. Werner/
Supervisory Patent Examiner (SPE), Art Unit 2624